Amendments to the Claims:

Please cancel Claims 19, 23, and 24; add Claim 29; and amend Claims 1, 2, 6, 7, 9, 11, 16, and 20 as indicated in the following listing of claims, which replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for forming an optical waveguide on a substrate in a process chamber, the method comprising:

depositing an undercladding layer over the substrate;

forming a plurality of separated optical cores over the undercladding layer, the plurality of optical cores defining a sequence of gaps; ~~and~~

depositing ~~an~~ a first uppercladding layer over the ~~at least one core~~ plurality of cores and within the gaps with a high-density plasma process having a deposition-sputter ratio between 3:1 and 10:1 to partially fill the gaps, wherein the deposition-sputter ratio is defined as the ratio of a sum of a net deposition rate and a blanket sputtering rate to the blanket sputtering rate for the high-density plasma process; and

depositing a second uppercladding layer over the first uppercladding layer with a PECVD process to completely fill the gaps.

2. (Currently Amended) The method recited in claim 1 wherein depositing the first uppercladding layer comprises:

flowing an oxygen-containing gas and a silicon-containing gas into the process chamber to produce a gaseous mixture;

generating a high-density plasma from the gaseous mixture; and

depositing a silicate glass layer over the at least one core with the high-density plasma.

3. (Original) The method recited in claim 2 wherein a flow rate of the oxygen-containing gas is more than 1.8 times a flow rate of the silicon-containing gas.

4. (Original) The method recited in claim 3 wherein the flow rate of the oxygen-containing gas is greater than 175 sccm and the flow rate of the silicon containing gas is between 80 and 110 sccm.

5. (Original) The method recited in claim 4 wherein the oxygen-containing gas comprises O_2 and the silicon-containing gas comprises SiH_4.

6. (Currently Amended) The method recited in claim 2 wherein depositing the <u>first</u> uppercladding layer further comprises flowing an inert gas into the process chamber with a nonzero flow rate less than 200 sccm.

7. (Currently Amended) The method recited in claim 2 wherein depositing the <u>first</u> uppercladding layer further comprises flowing a fluorine-containing gas into the process chamber with a flow rate between 10 and 20 sccm.

8. (Original) The method recited in claim 7 wherein the fluorine-containing gas comprises SiF_4.

9. (Currently Amended) The method recited in claim 2 wherein depositing the <u>first</u> uppercladding layer further comprises flowing a phosphorus-containing gas into the process chamber with a nonzero flow rate less than 30 sccm.

10. (Original) The method recited in claim 9 wherein the phosphorus-containing gas comprises PH_3.

11. (Currently Amended) The method recited in claim 2 wherein depositing the <u>first</u> uppercladding layer further comprises flowing a boron-containing gas into the process chamber with a nonzero flow rate less than 20 sccm.

12. (Original) The method recited in claim 11 wherein the boron-containing gas comprises BF_3.

13. (Original) The method recited in claim 2 further comprising applying an RF source power to the process chamber, the RF source power having a power density between 6 and 30 W/cm^2.

14. (Previously Presented) The method recited in claim 2 further comprising applying an RF bias power to the substrate, the RF bias power having a nonzero power density less than 16 W/cm^2.

15. (Previously Presented) The method recited in claim 2 wherein depositing the silicate glass layer comprises depositing the silicate glass layer at a pressure less than 12 millitorr.

16. (Currently Amended) The method recited in claim 1 wherein depositing the <u>first</u> uppercladding layer comprises:

flowing O_2 into the process chamber with a flow rate greater than 175 sccm;

flowing SiH_4 into the process chamber with a flow rate between 80 and 110 sccm such that a ratio of the O_2 flow rate to the SiH_4 flow rate is greater than 1.8:1;

flowing SiF_4 into the process chamber with a flow rate between 10 and 20 sccm;

flowing Ar into the process chamber with a nonzero flow rate less than 200 sccm;

generating a high-density plasma from the gases flowed into the process chamber; and

applying an RF bias power to the substrate, the RF bias power having a nonzero power density less than 16 W/cm^2.

17. (Previously Presented) The method recited in claim 1 further comprising:

etching a portion of the uppercladding layer in the gaps defined by the plurality of optical cores; and

depositing a second uppercladding layer over the etched uppercladding layer.

18. (Original) The method recited in claim 1 wherein the high-density plasma process comprises a high-density plasma electron-cyclotron-resonance process.

19. (Canceled).

20. (Currently Amended) The method recited in claim 1 wherein the <u>first</u> uppercladding layer has a refractive index between about 1.4443 and 1.4473 at a wavelength of 1550 nm.

21. (Withdrawn) An optical waveguide made according to the method recited in claim 20.

22. (Withdrawn) An optical waveguide made according to the method recited in claim 1.

23. – 28. (Canceled).

29. (New) The method recited in claim 1 wherein the first uppercladding layer fills the gaps to approximately 75% of a height of the cores and the second uppercladding layer fills a remainder of the gaps.